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DEPARTMENT OF COMMERCE

TECHNICAL NEWS BULLETIN

OF THE BUREAU OF STANDARDS

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LENGTH AND ANGLE MEASUREMENT LABORATORY AND EQUIPMENT

A new room specially constructed for use as a high precision length measurement laboratory has recently been completed at the bureau. The installation of equipment is now in progress. This room was excavated below the physical laboratory building, and owing to its location and construction the temperature changes are small. In addition, thermostatic regulation of the temperature is provided by electric heating. Space, as well as electrical and plumbing

connections, have been provided for a later installation of equipment for cooling the room if found desirable. Massive piers have been constructed on which the equipment is to be mounted, these piers being separated from the floor so that neither vibration or distortion of the piers nor apparatus will be caused by observers walking or standing in the room. Detailed plans were worked out for the location of equipment, electrical wiring, and plumbing before the work of construction was begun. In consequence this laboratory is especially well arranged for precise work, and will be provided with every facility which experience has shown to be useful. There is no excess of space, but even with all of the equipment in place it is believed that there will not be an overcrowded condition.

A circular-dividing engine with a table 1 meter in diameter and having an accuracy claimed by the maker to be within one-half of a second of arc is one item of the new equipment for this room. This will be used for graduating precision theodolites and other geodetic and physical instruments. It is expected that a considerable amount of graduating for the U. S. Coast and Geodetic Survey will be done on this machine. Accompanying this is a circle-testing machine for calibrating the errors of graduation of divided circles.

The bureau's precision one-meter transverse length comparator has already been moved from its former location to this room. Plans are now under

way to make some alterations in this comparator so that it will be adequate for the requirements of modern precision measurement. A new comparator having a longitudinal motion has been purchased and its installation is expected early this fall. This new comparator is especially designed for calibrating the subintervals of a graduated line standard, whereas the transverse comparator is especially designed for comparisons of the total lengths of two standards.

All the work to be done in this laboratory is of a fundamental nature. When the equipment is all in place and in operation, and when changes now contemplated in the transverse comparator have been completed, it is believed that this new laboratory will be one of the best, and probably the best, of its kind in the world.

THERMAL EXPANSION OF BERYLLIUM AND ALUMINUM-BERYLLIUM ALLOYS

Data on the linear thermal expansion of beryllium were reported in Technical News Bulletin No. 118, February, 1927. The investigation on the thermal expansion of this metal and aluminum-beryllium alloys (4 to 33 per cent beryllium) was undertaken because of the interest shown in aluminum-beryllium alloys in connection with automotive-engine pistons, there being no information available on this subject. Expansion determinations were made over various temperature ranges between -120 and $+700$ °C. on a sample of beryllium (98.9 per cent), and between room temperature and 500 °C. on the aluminum-beryllium alloys.

Beryllium, a metal about 30 per cent lighter than aluminum, has received until recently very little attention. This interesting metal expands considerably less than aluminum and approximately the same as iron or ordinary steel.

Aluminum-beryllium alloys also expand less than aluminum. For example, an aluminum-beryllium alloy containing 30 per cent beryllium has coefficients of expansion approximately 20 per cent less than those of aluminum. The relations between the coefficients of expansion

and the chemical composition were compared with the equilibrium diagram obtained by Oosterheld, and were found to be in agreement with the theory for this type of diagram.

A scientific paper which gives detailed data on beryllium and aluminum-beryllium alloys is now in press. It is believed that this paper will be valuable to persons interested in the properties of light alloys.

MEASURING THREAD ANGLE OF TAPER THREAD RING GAUGES

The thread angle of ring gauges is usually determined from a plaster cast of the thread, and the angle of the two sides of the thread is reported with relation to a line perpendicular to the axis of the thread. Ordinarily this line should bisect the total thread angle. In determining the half angle, reference is made to the minor diameter of the ring as shown by the cast, the minor diameter being assumed to have the nominal taper. The correctness of this assumption can be checked for a straight thread ring by ascertaining whether or not the minor diameter of the ring is the same at both ends. In the case of a taper ring, if of sufficient length, the difference in minor diameter at the two ends serves as a basis for the angle measurements. For a thin ring with a taper thread, measurement of the minor diameter is not sufficient check, and in general, is not a satisfactory method. To overcome this difficulty, a plain taper plug hardened and ground with known taper equal to the nominal taper of the minor diameter of the ring has been made. This plug has a longitudinal slot in which the cast can be made when the ring is slipped on the plug. After the cast has set, the taper plug is first removed from the ring and then the cast is removed from the ring. For measurement of thread angle in the thread projector, the cast is inserted in the slot of the taper plug gauge and the outside of the taper plug is used as the reference in determining the errors in half-angle of thread. One taper plug has been made and used and other sizes will be made as required.

ROAD TESTS OF AUTOMOBILE HEAD-LIGHTING

The bureau has cooperated with the Society of Automotive Engineers and the Illuminating Engineering Society in research work on various phases of the automobile headlighting problem. Research associates assigned to the automotive power plants section have been engaged for several months in a systematic study of the types of light distribution required for satisfactory vision under usual driving conditions in the absence of opposing traffic. This work is done late at night on near-by highways, using cars provided with special test equipment which includes four head lamps mounted side by side on a bar so that they can be aimed individually or collectively. These lamps have interchangeable lenses of various kinds and the brightness of the lights is controlled by means of rheostats.

The usual method of test is to set up a dummy, about the size and shape of a grown man, and to record the various distances at which it can be seen and identified under various conditions with various lighting distributions. As might be expected, the darker the night the greater the visibility for a given beam intensity and pattern. Visibility is found to be practically the same for all speeds between a walk and 40 miles per hour. The effect on visibility distance of tilting the beam and of using lenses which give various vertical and horizontal spreads has been studied and the data are represented graphically by a series of three dimensional figures carved out of wood.

Attention is now being directed to a study of optimum illumination when meeting other vehicles. For use in this work, a test car belonging to the bureau has been equipped with one of the four head-lamp test sets and other special devices. The four head lamps are mounted at the rear of this car but are controlled from the driver's seat, as is a dummy which is carried on the right-hand running board. This car keeps some distance in advance of the observer's car until a suitable test location is

reached. The driver then swings to the left, stops, and turns on his rear headlights, to simulate a car coming from the opposite direction. He also swings the dummy out alongside of his car. The observer keeps on until he can definitely distinguish the dummy beyond and to the right of the opposing lights. For convenience in measuring visibility distance, the observer uses an Army aiming circle as a range finder.

The National Automobile Chamber of Commerce has provided funds for this series of road tests which are under the general direction of a joint steering committee on headlight research. It should be pointed out that the present program contemplates no tests of commercial headlighting equipment. The aim is to ascertain what types of light distribution are preferable from the automobile driver's point of view. What devices will best serve to realize such optimum light distribution is a practical problem which must be left to the car and lamp manufacturers.

SHIPMENT OF STANDARD CELLS TO JAPAN

International agreement on fundamental standards is of the utmost importance. With the object of promoting standardization among nations, the bureau has always taken an active part in cooperative research in many fields.

The International Bureau of Weights and Measures has adopted a program for the intercomparison of the fundamental electrical units as maintained by the various national laboratories. One of the most important matters in such interlaboratory comparisons is the transmission of the actual standards from one laboratory to another. This is especially true of standard cells.

The Bureau of Standards recently shipped to Japan four standard cells of the unsaturated type. Two of these cells belong to the Japanese Government and the other two were made at the bureau. One had been to Japan before for comparison.

The cells were packed in a small box hung on gimbals within a larger box,

which in its turn was packed in an ordinary packing case. This precaution is necessary to avoid the possible mixing of the contents of the two legs of the cell which occurs when the cell is inverted.

STORAGE BATTERY FOR WASHINGTON MONUMENT

The electric elevator of the Washington Monument is required to perform somewhat peculiar and exacting service. A large number of passengers must be handled on each trip and owing to the great height of the shaft and absence of natural illumination any failure of the power must be carefully guarded against.

An interesting request was received by the bureau from the Director of Public Buildings and Public Parks to determine the feasibility and required capacity of a stand-by storage-battery installation to operate the elevator in case of interruption to the usual power supply. As a result of this investigation reports have been prepared and submitted on the current consumption of the elevator, on a storage battery to care for the elevator motor and lights, in an emergency, and on a specification for this battery.

The plan appears to be a feasible one.

ACCELERATED WEATHERING TESTS FOR PAINT AND VARNISH

The equipment designed by the bureau for accelerated weathering tests on paint and varnish has now been in use for seven months and is giving very encouraging results. The apparatus supplies a cycle of four exposures; light, water, refrigeration, and ozonized air, to which all samples are subjected, the complete cycle, with time for inspection, occupying 24 hours. The total length of the test can be varied as seems desirable.

The material to be tested covers 3 by 6 inch panels, and the four parts of the apparatus are designed to accommodate samples of this size.

The light tank is an open cylinder of galvanized iron, 30 inches in diameter and 15 inches high. The cylinder is supported above a pan of water with an air opening between the surface of the water and the lower edge of the cylin-

der, so that there is an upward current of air passing over the water and up through the cylinder. Attached to the inside surface of the cylinder are 30 slotted holders for the test panels. The light, which is mounted in the center of the cylinder, is a flaming carbon arc, the spectrum of which approaches closely that of sunlight.

The ozone equipment employs regular commercial apparatus for ozonizing the air and a glass tank in which the specimens are exposed. Water is kept in the bottom of this tank to moisten the ozonized air. As used in this work, the apparatus delivers about 660 liters of air per hour, containing 0.56 liters of ozone, or about 0.08 per cent ozone (by volume).

In external appearance the rain tank is similar to the light tank but of smaller diameter. It is provided with holders for the test panels, and contains a revolving lawn sprinkler. Water at a temperature of 34° C. (93° F.) is used.

The refrigeration equipment involves no unusual features.

The regular test program is made up as follows: Exposure to ozonized air for 3 hours, rain for 3 hours, light for 17 hours, and inspection 1 hour. In addition, on three days a week, the panels are subjected to refrigeration at a temperature of -23° C. (-10° F.) for one hour, one-half hour being subtracted from the periods for exposure to ozone and rain.

The order of exposure is varied on different days, and, as before mentioned, the total length of the test may be altered as required.

EXPANSION OF NEAT PORTLAND CEMENT IN STEAM

An investigation was made of the volume changes produced in various Portland cements when neat cement specimens were subjected to steaming and boiling tests. Data were secured on 32 different cements when tested by the following four methods: (a) The regular specification test, 5 hours steaming of cement pats; (b) the Le Chatelier tongs test, involving 6 hours boiling; (c) bars,

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1 by 1 by 6 inches, steamed 5 hours, and measured by a special micrometer, bearing against glass inserts in ends of bars; (d) identical bars and treatment as in preceding test, but measurements made microscopically by comparator, using glass capillary tubing inserts for markers. The neat cement bars were stored in a constant temperature cabinet, maintained at 21° C. (70° F.) prior to test and for one hour after their removal from the steam, when the final measurement was made.

No deductions are herein made as to the relative merits of these cements, as indicated by the results of these tests. However, the following brief observations are interesting:

1. The usual specification test of the neat cement pats did not give any indications of the relative expansive properties of the cements. All of the cements were "sound."

2. The Le Chatelier tongs did not give very concordant results, nor did the results seem to agree very closely with those obtained by methods (c) and (d).

3. Test method (c) showed that the expansion of none of the cements was great compared with what might be expected of those cements which would prove to be "unsound" in the specification tests of pats. However, the tests of the bars did show that the relative expansive properties of some of the 32 cements varied widely, being grouped as follows:

Group	Number of cements in group	Expansion obtained
		Per cent
1.....	7	0.000 to 0.010
2.....	12	.011 to .020
3.....	7	.021 to .030
4.....	5	.031 to .040
5.....	1	.061

4. In general, the results of method (c) were confirmed by method (d), but the latter method did not give such concordant results for individual tests as (c), notwithstanding the more elaborate and precise nature of the comparator

instrument. It is thought that slight warping of occasional specimens may have greatly disturbed the relative directions of the glass tubing inserts. Method (d) was much more difficult and consumed more time than method (c).

5. The foregoing is based on the tests of cement mixed to a "normal consistency." The series of tests was then repeated, using a wetter mix, containing 42 per cent of water (per cent by weight of cement). The results obtained confirmed the observations made on the specimens of normal consistency, although some slight changes would be produced in the grouping as given above.

FINENESS OF SLAKED CHEMICAL QUICKLIME

A determination of the fineness of slacked chemical quicklimes has been undertaken. The data obtained will form the basis of specifications covering lime for use in chemical industries. Many of these industries find it advantageous to use quicklimes in order to utilize the heat of hydration. This principle is used, for example, in the liberation of ammonia from the ammoniacal liquors produced in the by-product coke industry. In those industries in which quicklime is used as a reagent, it is desirable that the disintegration of the quicklime during the process of hydration should be as complete as possible. A fine state of subdivision increases the rate of solubility and the speed of reaction. Coarse material not only decreases the solubility and efficiency of the lime, but also has a deleterious effect on processing machinery.

In the method which the bureau is following in its fineness determinations a 100-gram sample of quicklime is added to an excess of water. The lime-water mixture is agitated frequently during the first hour. During the next 23 hours the mixture is stirred 6 times. The stirring is carried on cautiously to prevent the mechanical disintegration of the large particles which naturally occur. Of the samples of quicklime only one was of dolomitic origin, in which case precautions were taken against drowning. The

mixture was then poured through a series of standard sieves nested as follows: Nos. 30, 50, 100, and 200. The determination of the amount of material retained on the sieves, as washed through by using a moderate stream of water from a one-quarter-inch rubber tube, followed substantially the practice recommended by the American Society for Testing Materials for determining the fineness of mazon's hydrated lime. The washing was continued until the water passing through the sieves was clear. In no case was it found necessary to continue the washing for over 10 minutes. The sieves were placed in an electrically heated drying oven for one hour and the contents on each sieve finally weighed.

The following results give the progress of this investigation to date:

Through sieve No.	Retained on sieve No.	Sample No.				
		11	21	24	28	35
		Per cent	Per cent	Per cent	Per cent	Per cent
-----	30	0.9	2.2	3.1	10.3	3.1
	50	0.8	1.7	2.3	2.2	7.4
	100	2.6	0.7	1.3	2.1	6.9
	200	0.9	2.2	3.7	2.2	5.6
1200	-----	94.8	93.2	89.6	83.2	77.0

¹ By difference.

QUALITIES OF FIRE-CLAY REFRACTORIES

The study of the fundamental qualities of representative fire-clay refractories and individual clays has been referred to and described in Technical News Bulletins Nos. 117 (January, 1927) and No. 121 (May, 1927). The effect of reheating at high temperatures on the thermal dilatation has now been observed. The importance of thermal dilatation as a factor controlling resistance to thermal spalling has been discussed at length in recent literature and the significance of differential thermal dilatation and fiber elongation was briefly referred to in Technical News Bulletin No. 121. Factors of possible significance are not only the differences in thermal dilatation of the various constituents of the refractory structure but also the difference in

thermal dilatation between one portion of a structure and an adjacent portion.

In actual service 9-inch brick are usually laid in header courses; that is, only the $2\frac{1}{2}$ by $4\frac{1}{2}$ inch end is exposed directly to the heat. Since fire-clay refractories are fairly good heat insulators, the maximum temperature 2 inches from the "hot face" may never exceed $1,200^{\circ}$ C. ($2,200^{\circ}$ F.) even though the "hot face" is heated for prolonged periods as high as $1,450^{\circ}$ C. ($2,642^{\circ}$ F.). Since clay refractories are initially fired at temperatures from $1,250^{\circ}$ to $1,275^{\circ}$ C., it is unlikely that the structure 2 inches from the "hot face" would be greatly affected in service. However, the data obtained show that the material at and immediately adjacent to the "hot face" may be changed very materially as regards thermal dilatation.

Average values for 17 representative brands of fire clay show that reheating at $1,400^{\circ}$ C. ($2,552^{\circ}$ F.) for 5 hours reduced the per cent linear thermal expansion and contraction of the brick (calculations based on values obtained on brick as received) by 0.04 per cent, and that the per cent linear expansion from room temperature to 900° C. has been changed by 0.1 per cent. Furthermore, reheating at $1,500^{\circ}$ C. for 5 hours changed the per cent linear expansion, from room temperature to 200° C., an average of 0.07 per cent, and from room temperature to 900° C. it was changed 0.15 per cent. Certain brick of the siliceous type showed changes greatly exceeding these average values. The maximum changes observed were as follows: (a) (After reheating at $1,400^{\circ}$ C. for 5 hours) room temperature to 200° C., 0.09 per cent change in linear thermal expansion; room temperature to 900° C., 0.17 per cent; (b) (after reheating at $1,500^{\circ}$ C. for 5 hours) room temperature to 200° C., 0.16 per cent; room temperature to 900° C., 0.30 per cent.

A preliminary report of this phase of the investigation, together with a discussion of its significance as regards thermal spalling, was published in the September, 1927, issue of Fuels and Furnaces.

FUNDAMENTAL STUDY OF GLAZE FIT

An investigation is being conducted at the Columbus branch of the bureau to determine the effect of the various oxides on the tensile strength, modulus of elasticity, and coefficient of expansion of glazes. To date about 85 glazes have been melted into rods, and the tensile strength and modulus of elasticity determined. The coefficient of expansion has been determined on about 20 of the glazes.

The modulus of elasticity and tensile strength is not strictly a straight-line function of the batch composition of the glazes. This is especially true of glazes containing boron and lead. Factors applicable to the various oxides have been worked out for the modulus of elasticity and the tensile strength of the glazes. These factors enable one to calculate the two properties with about the same accuracy that can be obtained in the actual measurements. Some of the factors for a given oxide vary, depending on the total amount of the oxide present in the glaze.

The following observations have been made during a study of crazing:

(1) Crazing may take place either (a) as soon as the ware is removed from the kiln or (b) several months after the body is removed from the kiln. This latter type of crazing is caused by changes which may take place in the body, such as rehydration, or by changes which may take place in the glaze. Such changes take place in glass and are designated as "afterworking of the glass." In this case the change is a contraction. It is significant that sodium and potassium glasses have a considerable after-working change, which is reduced by increasing the lime and alumina. Both of these changes would tend to throw a glaze that was initially in compression to tension, thus producing crazing.

It is fully realized that the batch composition does not represent the ultimate composition of the glaze because of the volatilization of certain constituents and

the reaction of glaze and body constituents. However, given a certain glaze and body composition it is hoped that the information obtained in this study will enable one to vary the physical properties of the glaze by varying the chemical composition, so that a better fit can be obtained between body and glaze. This will be true if the effect of each oxide on the various physical properties is known.

WINDOWS OF WINDOW ENVELOPES

An investigation covering windows of window envelopes, made for the purpose of developing standard specifications for the windows, is reported in Technologic Paper No. 343, recently issued.

There are three types of window envelopes in use: The open-panel envelope, the one-piece envelope, and the two-piece envelope. Only the last two types, of course, were considered in this investigation. The one-piece envelope is made from a single sheet of paper. The window is made by impregnating that portion of the envelope pattern through which the address is to be read with a suitable oil or varnish. The two-piece envelope is made of two pieces of paper. The envelope pattern is cut from an opaque, or nearly opaque, sheet of paper. A window of such form and area as to permit the address on inclosed correspondence to be plainly seen is cut from the portion which is to be the face of the envelope. The window is then closed during the process of manufacture by cementing over it, on the surface which is to be inside the sealed envelope, a piece of glassine paper or other nearly transparent material.

The two most important properties of envelope windows are transparency and gloss. In order to facilitate in the highest degree the handling of mails, the windows should be as transparent as possible, and their surfaces should have a very low finish. For the purpose of securing data to be used as a basis upon which specifications for these properties might be drafted, test samples were se-

cured from practically every manufacturer of glassine paper and of one-piece window envelopes in the country, consisting of 17 samples of glassine papers and 10 samples of one-piece window envelopes.

Opacity tests were made with the apparatus described in Bureau of Standards Circular No. 63. The windows of one-piece envelopes compared in opacity very favorably with glassine papers. The actual results are, in terms of contrast ratio (see Circular 63), as follows: The average opacity of glassine is 0.186, and of one-piece windows 0.183. The minimum opacity of glassine is 0.112, and of one-piece windows 0.141.

Gloss determinations were made by means of the Ingersoll glarimeter, which is described in "The glarimeter and the measurement of the finish of paper," Paper Trade Journal, Volume 80, No. 7, p. 47; February 12, 1925. Windows of one-piece envelopes were more glossy than the glassine papers. The actual results, in per cent, are as follows: The average gloss of glassine papers is 75.3, and of one-piece windows 84.1. The minimum per cent gloss of glassine is 68.4, and of one-piece windows 77.5.

The glassine papers were more permanent in transparency than the one-piece windows. After 50 hours exposure to sunlight through window glass, glassine papers increased in opacity by 11.2, and one-piece windows by 18.7 per cent. One-piece windows remained permanent in transparency, after a small initial decrease, during a test period of nearly a year, when stored in a cool, dry, and nearly dark place. Glassine papers showed no change in transparency under these conditions during this test period.

The paper gives suggested specifications for the two types of windows, methods for sampling and testing, and regulations of the Post Office Department relating to window envelopes. Copies of this publication may be secured from the Superintendent of Documents, Government Printing Office, Washington, D. C., at 5 cents each.

DRY CLEANING SOLVENT SPECIFICATION

A specification for Stoddard dry cleaning solvent has been prepared in complete form. Much confusion has existed in the trade and in testing laboratories in regard to the proper methods of the various tests required. In the present form, instead of reference to various sources, complete procedures for each test are included.

Solvent complying with Stoddard's specification is a high flash-point petroleum product, which has been adopted by the dry-cleaning industry to lessen the loss of life and property by explosion and fire. The flash-point specified is 37.8° C. (100° F.), minimum, closed-cup test. The distillation requirements are: Initial boiling point 148.9° C. (300° F.), end point 210° C. (410° F.).

Many of the refineries are offering products complying with this specification under proprietary names.

GREATER PURCHASING POWER

Business men are devoting much energy these days to making the public want to buy their goods—to creating among consumers the "desire to buy." For the consumer who translates this desire into action through purchasing the goods, the path to possession is made smoother by the deferred-payment plan. Some sellers may feel this is about as far as they can go toward making it easier for the public to buy their wares.

On the other hand, as more of our business men study the primary forces producing continuous purchasing power, we may expect to see more attention given to making the public better able to buy. In other words, in this constant struggle for a larger portion of the consumer's dollar, consideration must be given not only to the dollar he now has in hand, but also to those likely to come into his hands after this one is gone. Where are the future "consumer dollars" coming from? How many of them will there be per consumer?

Certainly not all of the effort should center on getting more of the consumer's present income away from him. Some

of the effort might well be directed toward strengthening, or even increasing, the consumer's income as a guarantee of the constancy of his purchasing power. Continuous buying is the result of continuous power to buy and that power has to be regenerated or replenished as it is used.

Firms making consistent effort to eliminate waste through simplification and standardization, to improve both products and processes—thus to give better value for the same or for less money—are strengthening the consumer's power to buy. Likewise, companies endeavoring to stabilize employment in their plants, to provide steady jobs at good wages for their workers, are reinforcing the buying power of their own employees as part of the great consuming public.

It is not difficult to imagine the relative increase in consumption in many classes of goods if the present purchasing power of the average consumer were increased 10 per cent, nor is it hard to visualize the new wants and therefore the new opportunities for production that would spring up under such conditions. Increasing the power to buy means larger sales of goods to satisfy present wants, also a larger variety of wants than now prevails. Elimination of waste in industry creates greater purchasing power.

VETERANS' BUREAU ADOPTS SIMPLIFIED PRACTICE

The United States Veterans' Bureau has issued instructions to medical officers in charge of its hospitals to adhere to the simplified practice recommendations in making all future purchases of supplies and equipment for the various hospitals for the disabled veterans. In the instructions to the medical officers, the Director of the Bureau, Brig. Gen. Frank T. Hines, Reserve Corps, stated that "It is obvious that the benefit to be derived from any simplification is directly proportionate to the degree of adherence it receives and the Veterans' Bureau expects cooperation from the medical officers in its effort to eliminate waste."

The simplified practice recommendations concerned are: Vitrified paving brick; metal lath; files and rasps; smooth and rough face brick; common brick; range boilers; woven-wire fencing; woven-wire fence packages; milk bottles and caps; hollow building tile; structural slates; roofing slates; lumber; forged tools; builders' hardware; asbestos paper and asbestos millboard; hot-water storage tanks; steel reinforcing bars; sheet steel; eaves trough and conductor pipe; concrete building units; sand-lime brick; tissue paper; cut tacks and small cut nails; and sidewalk, floor, and roof lights.

REDUCTION IN VARIETY OF BLACK-BOARDS

At a conference of manufacturers and wholesalers, held July 28, in Chicago, a simplified practice recommendation was adopted by which composition black-boards were reduced in variety from 3 colors, 18 widths, and 90 lengths, to 1 color, 8 widths, and 13 lengths. This program will become effective for a period of one year beginning April 1, 1928, on new production.

SIMPLIFICATION IN LEATHER INDUSTRY

A preliminary conference on the calf-leather groups of the Tanners Council was held in Buffalo, N. Y., on July 19; this group favored simplified practice and standardization, and voted to appoint a simplified practice committee to investigate their problems with the view of arriving at a basis for the application of simplified practice.

SIMPLIFIED PRACTICE AMONG GEORGIA MANUFACTURERS

C. L. Williamson, secretary, the Atlanta Association of Credit Men, has been designated as chairman of a simplified practice committee to sponsor the simplified practice and elimination of waste movement among Georgia manufacturers and industrial executives.

It is expected that the work of this committee will be a valuable contribution to the further progress of waste

elimination and the maintenance of the prosperity which this country now enjoys. It is interesting to note that several State manufacturers' associations have appointed similar committees to cooperate with the Department of Commerce in the promulgation of simplified practice.

FARMERS' INTEREST IN MANAGEMENT WEEK

That expertness in management is of the same importance to the successful farmer as to the industrial executive is reflected in the interest shown in the 1927 program of "Management Week" by the National Grange, and the American Farm Bureau Federation, the officials of these organizations having signified their willingness to cooperate in its presentation.

LOWER PRODUCTION COSTS OF WORLD-WIDE IMPORTANCE

In its discussion of industry, the World Economic Conference at Geneva stated that the present industrial difficulties of Europe are not due to an inadequacy either of scientific invention or of raw material, but to a lack of sufficient capital and to an inadequate market for the productive capacity of many industries. The conference considered its central problem to be the lowering of production costs and therefore prices, with the object of securing a better equilibrium between plant capacity and demand, without injuring either the consumer or the worker.

The conference, to this end discussed the progress of "rationalization" by which is meant the technique and organization designed to secure the minimum waste of effort and material. It recommended that industry throughout the world should encourage and promote in every way the processes of scientific management; the standardization of materials and products; and the improvement of transport and marketing.

NEW PUBLICATIONS

Additions to Supplementary List of Publications of the Bureau of Standards (beginning July 1, 1926)

Scientific Papers¹

- S550. Application of the algebraic aberration equations to optical design; I. C. Gardner. Price, 45 cents.
 S552. Transmission of sound through building materials; V. L. Chrisler. Price, 5 cents.
 S554. Determination of sulphur trioxide in the presence of sulphur dioxide, together with some analyses of commercial liquid sulphur dioxide; J. R. Eckman. Price, 5 cents.

Technologic Papers¹

- T343. Study of the windows of window envelopes for the purpose of developing standard specifications; R. E. Lofton. Price, 5 cents.
 T344. Comparison of American, British, and German standards for metal fits; I. H. Fullmer. Price, 10 cents.
 T345. Determination of weight per gallon of blackstrap molasses; C. F. Snyder and L. D. Hammond. Price, 5 cents.
 T347. Effect of laundering upon the thermal insulating value of cotton blankets; P. Rudnick. Price, 5 cents.

Circulars¹

- C25 (9th ed.). Standard samples. General information. (Available free upon request to Bureau of Standards.)
 C319 (2d ed.). Alphabetical index and numerical list of United States Government master specifications, promulgated by the Federal Specifications Board. (Available free upon request to Bureau of Standards.)
 United States Government master specifications for:
 Cr86 (2d ed.). Typewriter ribbons. Price, 5 cents.
 Cr87 (2d ed.). Hectograph ribbons. Price, 5 cents.

¹ Send orders for publications under this heading, with remittance, only to Superintendent of Documents, Government Printing Office, Washington, D. C. Subscription to Technical News Bulletin, 25 cents per year (United States, Canada, and Mexico); 40 cents (foreign).

United States Government master specifications for—Continued.

C188 (2d ed.). Computing and recording machine ribbons. Price, 5 cents.

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¹ See footnote on p. 10.

² "Outside publications" are not for distribution or sale by the Government. Requests should be sent direct to publishers.

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